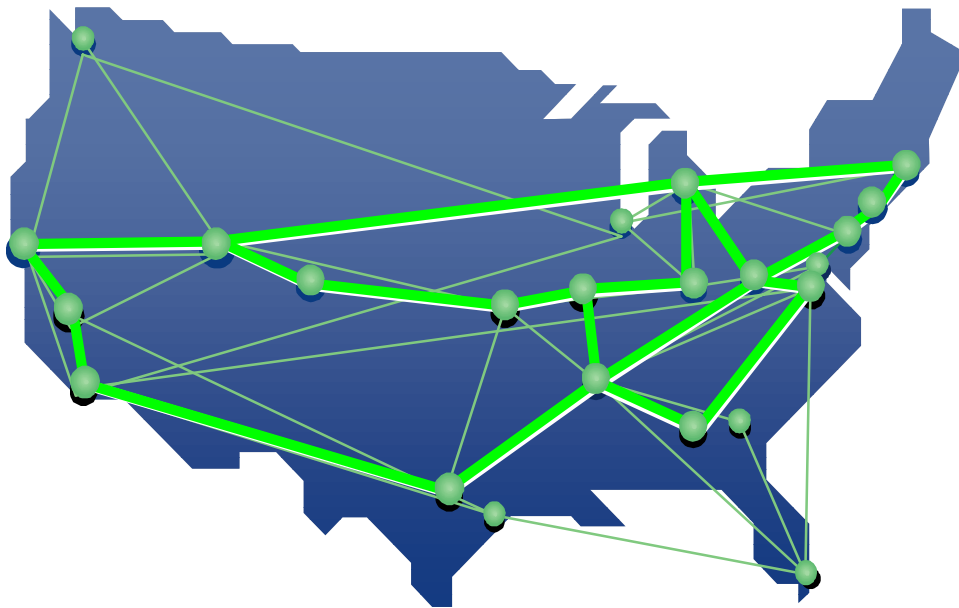


TREASURY COMMUNICATIONS SYSTEM (TCS)



Baseline Business Case

July 1999

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Dedication

“Just as the whole is often larger than the sum of its parts, the achievement of a Treasury-wide collaborative network has value beyond the network itself...it engenders a collaborative business community, where the incremental benefit from one innovation or business practice instantly accrues to all. The synergy of bureaus working together and evolving a uniformly secure and standard business architecture will provide a foundation befitting the world wide regard and esteem accorded the Secretary of the Treasury.

I am particularly indebted and touched by our customers’ patience and loyalty to the original intent of the TCS Vision, despite the longer than anticipated maturation process.”

James J. Flyzik

Foreword

This Baseline Business Case for the Treasury Communications Enterprise (TCS) establishes the investment checkpoint, against which we can compare, monitor, measure, and evaluate future investments for improvements and enhancements. As of 1QFY99, it demonstrates a business case for the current approach, in accordance with the current network architecture. A centrally delivered service remains the Departmental approach and continued improvements in customer service and further cost reductions are expected to provide the full business value intended by the TCS Vision. Further improvements or enhancements of the TCS will be the subject of subsequent “enhancement” business cases.

The alternative to the current TCS, called “the option”, was based on each bureau customer acquiring a totally independent network. Each independent network was constructed to perform the equivalent functions (so far as feasible) of the current customers, in the absence of the TCS. It was deemed reasonable to assume that each of the customers would manage their hypothetical independent networks in a manner comparable to their use of the 1QFY99 TCS. For example, customers using point-to-point dedicated circuits in TCS were assumed to do so in their independent network, and customers using commercial frame-relay in TCS were assumed to use commercial frame-relay in their independent network.

Attempts were made to freeze the current conditions and replicate them in the “option”, so that a fair comparison could be made. Factors, such as declining circuit costs, additional surcharges for the Universal Service Fund, Year 2000, and optimization efforts were deemed to affect the TCS and the “option” in a comparable manner and, therefore, were not incorporated into the comparison. The assumption was made that independent bureaus would be subject to the same architectural, regulatory, and legislative constraints and have comparable access to Government contracting vehicles, commercial rates, management techniques, and technology alternatives.

Findings

Purpose

This Baseline Business Case of the Treasury Communications System (TCS) validates the TCS Program as of December 1998 and provides a checkpoint against which future improvements can be measured. The Treasury Communications System, the current implementation of the Treasury Communications Enterprise (TCE), supports the diverse missions of the Treasury Department and its confederation of bureaus.

Background

While the TCS allows for considerable independence of design among its constituent customer networks, a collection of totally separate and independent bureau networks was pursued as an alternative to the TCS. This alternative, hereafter referred to as the “option”, forms the basis of comparison for the baseline business case, see Figure 1.

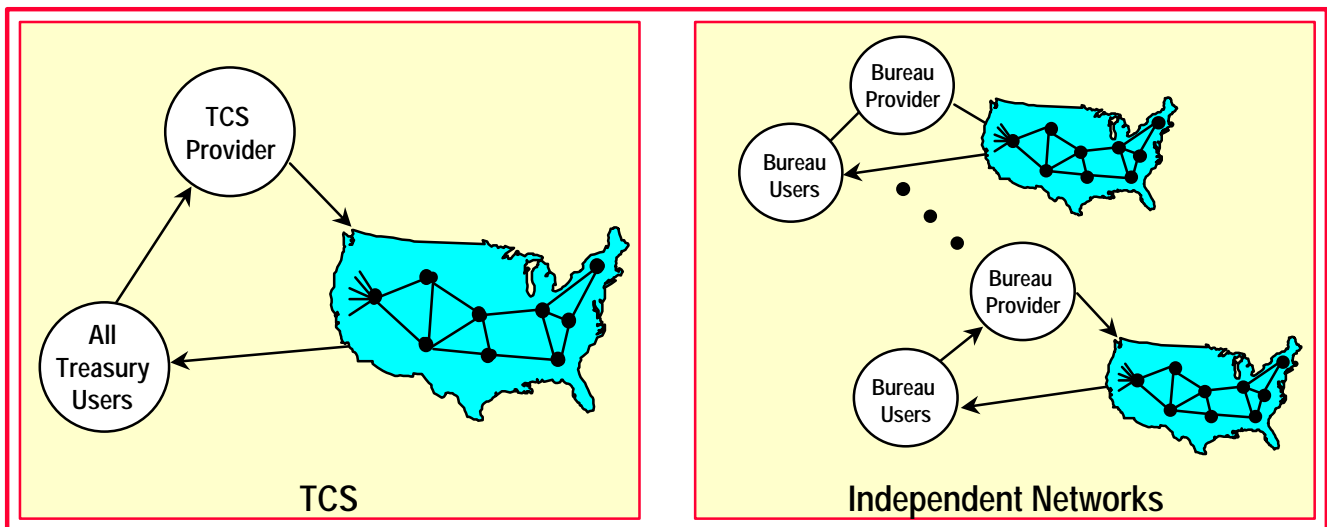


Figure 1. TCS and the Option

Attempts were made to freeze the current conditions and replicate them in the “option”, so that a fair comparison could be made. Factors, such as declining circuit costs, additional surcharges for the Universal Service Fund, Year 2000 (Y2K), and optimization efforts were deemed to affect the TCS and the “option” in a comparable manner and therefore were not incorporated into the comparison. The assumption was made that independent bureaus would be subject to the same architectural, regulatory, and legislative constraints and have comparable access to Government contracting vehicles, commercial rates, management techniques, and technology alternatives.

ROI Summary

The TCS has a significant cost advantage compared to the “option”. At the end of the first year, FY98, the cost advantage of the TCS is over 3 to 1, or about \$190 million. Five years later, at the end of FY02, the cumulative cost advantage of TCS approaches 2 to 1, at \$480M.

Return on Investment (ROI) is an estimated 176 percent for the TCS over time. The long term ROI is the annual savings of recurring costs, about \$91 million, divided by the investment consisting of the TCS recurring costs, about \$70 million.

Cost Benefits

The primary quantitative drivers for TCS include annual recurring circuit cost savings of \$54M, staff savings of \$16M, and maintenance savings of \$14M. The savings result from reduced circuit and maintenance costs from

traffic aggregation and reduced staffing costs due to centralized management, acquisition, operation, and integrated network management. TCS annual recurring cost of \$97M is about 50 percent of the independent networks, as shown in the total in Figure 2.

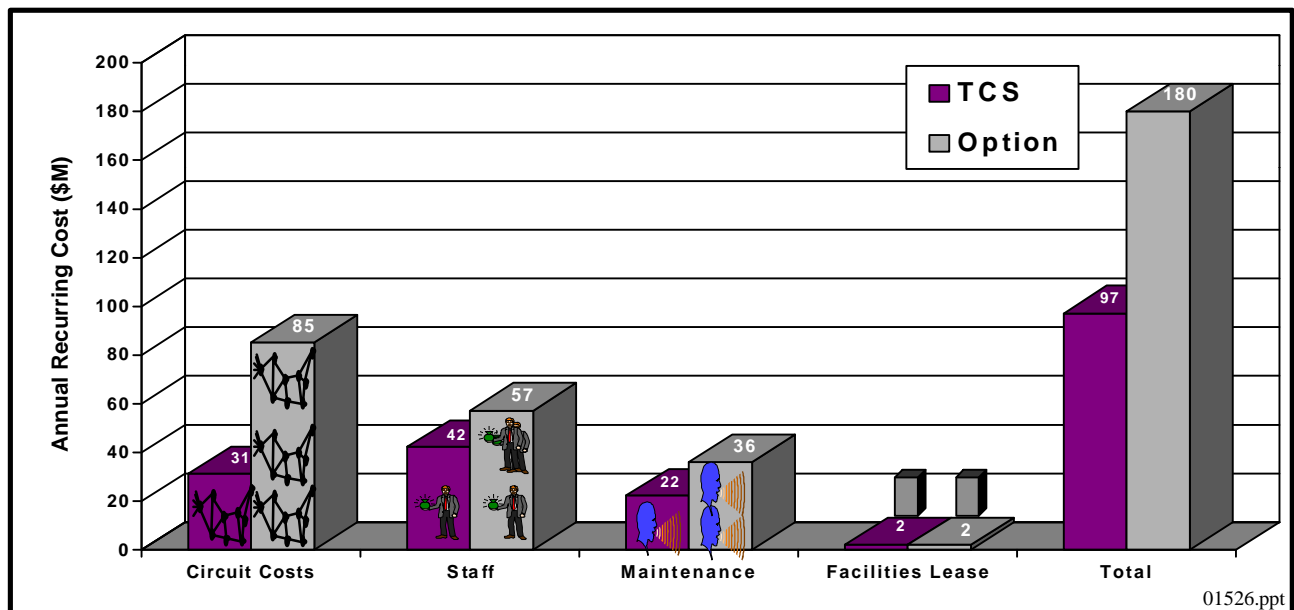


Figure 2. Comparative Recurring Costs

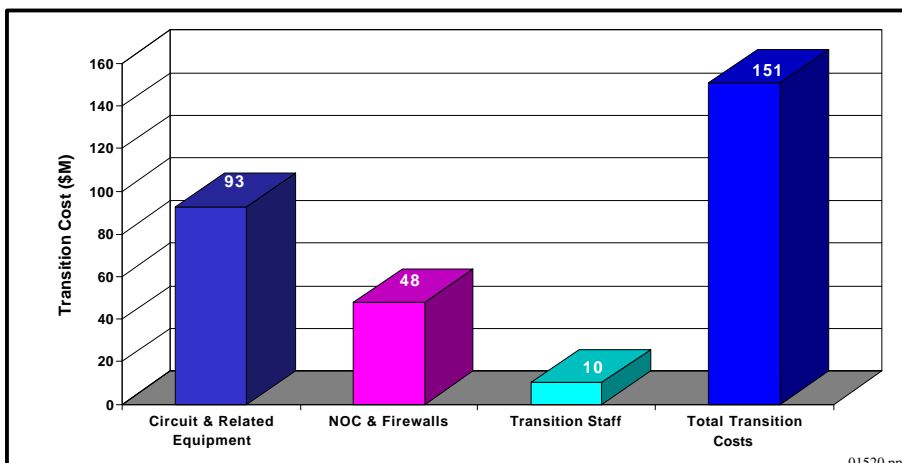


Figure 3. Transition Costs

Nonrecurring transition costs to create the option are illustrated in Figure 3. The transition staff costs were assumed to be partially covered by transfers from other accounts. Only the largest networks were assumed to acquire network operation centers (NOC)s comparable to that of TCS and that the NOCs acquired may, by using modern technology, avoid a need for a manager of managers such as “NetExpert”.

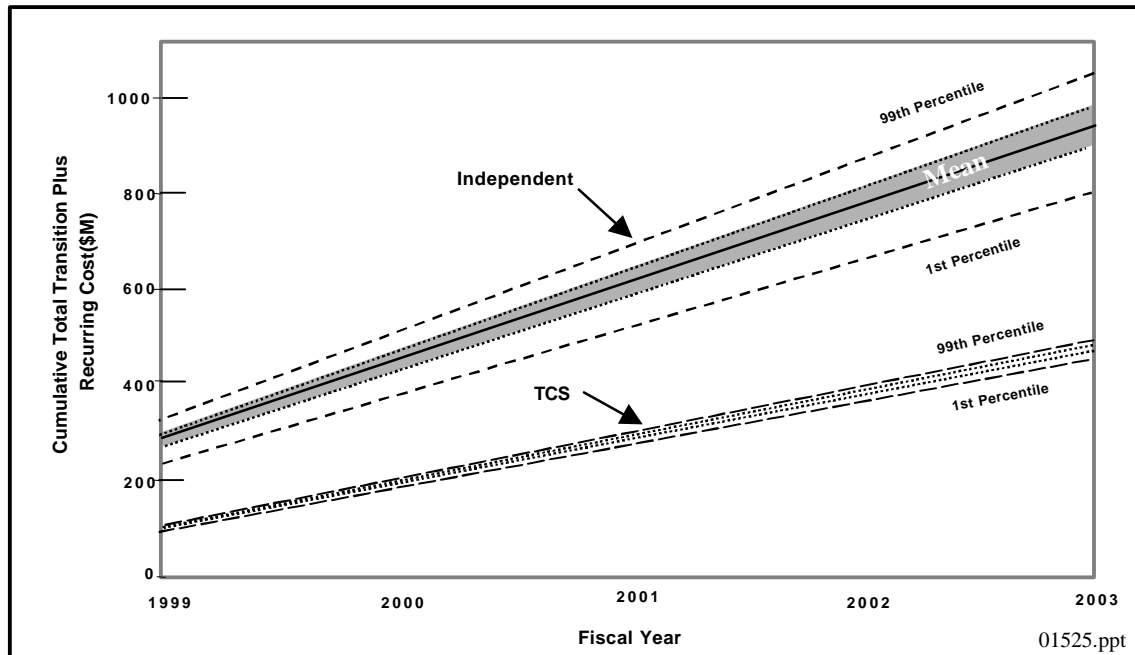


Figure 4. Cumulative Total Transition Plus Recurring Costs Trends

When non-recurring transition and equipment costs are included, the annual cost savings for TCS is over \$190M and up to \$480M in five years, as shown in Figure 4. The “option” FY99 costs include the transition cost to plan, design, fund, and implement the network services plus the cost for the parallel operation of the TCS during the transition year. The increases for the “option” after FY99 are exclusively the annual recurring costs.

The shaded area surrounding the trend lines reflects variant cost excursions within the “option” to emulate current differences among customers. The TCS future cost trend excursions considered the cost changes with modernization and reduced circuit cost. The percentile labels indicate the percent of the cost scenarios that lie below the given line: i.e. 99 % lies below the 99th percentile line. Each band of costs is labeled with a solid line for the average value.

Costs of various implementations were computed with Monte-Carlo sensitivity analysis techniques (Reference 1) that

simulated combinations of potential management and technical decisions for the architecture, circuits, staff, maintenance, and leases. The range of staffing for the independent networks “option”, for instance, ranges from 0 to full TCS staffing levels. Further information is contained in the Appendix.

The cost drivers for centralized networks are both quantitative and qualitative. As discussed previously, the primary quantitative drivers for TCS include reduced circuit, maintenance, and staffing costs. The qualitative drivers for centralized networks lead to the longer-term benefits of TCS.

Longer-Term Benefits

The longer-term benefits of TCS are more qualitative in nature. These include the advantages of Department-wide standardization and interoperability, the sharing of developments and technology infusion, uniform security measures, and the best practice of centralized asset management.

The qualitative factors are dominated by TCS's advantage in planning and achieving Department - wide standards and interoperability among its constituent members. Centralized management facilitates establishing and managing communication and information exchange standards for the enterprise. Standards are as indispensable for the enforcement, financial, and economic community of Treasury and bureau participants, as for a successful Government Services Information Infrastructure (GSII) and National Information Infrastructure (NII).

The integration and incorporation of uniform security measures is more effectively promulgated among a broad grouping of agencies or across an entire community in a centralized network. Independent networks tend to breed, amongst themselves, differences in security approach, implementation, standards, and policies.

With the implementation of one set of uniform security measures, the TCS can enable all members of the enforcement community within Treasury to collaborate and share information in a trusted environment. With the implementation of one set of uniform transaction security measures, the entire TCS community, including other agencies, would be enabled to perform secure business transactions with outside clients or business partners.

The implementation of value added services especially benefits from a centralized network. Value-added services can more easily be accommodated on a standard platform and the investment can be spread over a broader base. Independent networks transfer the benefits of value added services between the independent networks with more difficulty.

The TCS also better ensures effective technology infusion sharing among the organizations without impact to individual bureau control of critical services. The benefits

of shared development and technology refreshment include instantaneously passing the benefits accrued to one member of the community to all members of the community, with zero to minimal incremental cost to the enterprise. Independent networks would benefit only from those improvements appropriate to a more provincial mission and budget.

Best Business Practice

Realism of the findings was verified by a contrast with business "best practice" regarding trends of IT services management and staff costs.

While the benefits of shared development and technology refreshment are capable of instant replication in a centralized network, such as TCS, innovations are not as easily shared among independent or local networks. As summarized in a 1995 Gartner Group best practice report: *"We therefore discount new development outside IS organizations by 25 to 40 percent to reflect a failure to pass benefits on to the enterprise (beyond the local workgroup), based on our observations of applications delivered in local areas."*

Business "best practice" projections, as reported by the Gartner Group in July 1997,¹ tend to resemble TCS-like asset management and infrastructure. We believe that this provides a good foundation for a "Corporate

¹ "Spending in business areas [for IT] will rise, but infrastructure spending will be consolidated. This heralds a power shift toward corporate officers and away from suppliers and business unit managers. ... By 2002, 30 percent of enterprises will mandate that all infrastructure other than project-specific new infrastructure will be centrally refreshed and funded by a consolidated fund whose funding will be allocated to business areas; an additional 30 percent will require business areas to fund infrastructure, but will disallow acquisitions that violate their architectural and asset management business rules (0.6 probability)," - Gartner Group Research Note Strategic Planning, July 1997.

Utility” approach to a developing a charge-back approach that will be beneficial to our customer in the future.

The managing and supporting staff services with other costs are approximately 66 percent for the TCS, and 49 percent for the “option”. These percentages are better than the reported industry experience: *"Recent studies have indicated that managing and supporting enterprise networks accounts for 75% of the*

overall five year cost of ownership..." Communications Week, October 1997; cited by Eltrax Systems. In substantial agreement, *"In reality, two-thirds of most IT department time is spent doing enhancements, maintenance, production support (including help-desk), and infrastructure (software, and hardware upgrades, moves, and changes)"*; Dow Jones News/ Retrieval, 05/01/97.

The Treasury Communications System

In this section the TCS mission, functions, measures of merit, and compliance with pertinent requirements are described. The business case “option” of independently contracted networks could also satisfy the mission and requirements with comparable customer-level functionality, but at a higher cost.

TCS Mission

The TCS strategic planning initiative taken by the Treasury Department anticipated the National Performance Review (NPR) recommendation that Treasury take a leadership role in achieving the objective of Electronic Government. The strategic blueprint contained corporate visions of future capabilities and innovations in network-based computing services that position the TCS to be a key conduit in the Government Services Information Infrastructure (GSII). The TCS is also an essential public sector contributor to the National Information Infrastructure (NII). The NPR recommended that Treasury take a leadership role in providing the migration path to integrate tax and entitlement reporting and payment, linking law enforcement agencies and public safety, developing and promoting Electronic Commerce. The GSII and NII roles would be significantly more difficult or perhaps impossible for the “option” to satisfy.

In commenting on the changes in communication, Vice President Gore said, “This Administration intends to create an environment that stimulates a private system of free-flowing information conduits.” In order to achieve this, the NPR identified Agency telecommunications networks as major components of the GSII and key enablers for the re-engineering of business processes.

The TCS enables the Treasury Department and its bureaus in satisfying their missions that are listed below (Reference 2):

- **Economic Mission.** *Promote Prosperous and Stable American and World Economics.*
- **Financial Mission.** *Manage the Government’s finances.*
- **Law Enforcement Mission.** *Protect our financial system and our Nation’s leaders, and foster a safe and Drug-free America.*
- **Management Mission.** *Continue to build a strong institution.*

TCS serves the missions of Department offices and the following Treasury agencies:

- *Bureau of Alcohol, Tobacco, and Firearms*
- *Bureau of Engraving & Printing*
- *Bureau of Public Debt*
- *Comptroller of the Currency*
- *Customs Service*
- *Executive Office of Asset Forfeiture*
- *Federal Law Enforcement Training Center*
- *Financial Crimes Center*
- *Financial Management Service*
- *Internal Revenue Service*
- *Mint*
- *Office of the Inspector General*
- *Office of Thrift Supervision*
- *Secret Service.*

TCS benefits other Government agencies, creating a model and a capability for the GSII. The TCS grants its services to agencies Government-wide, such as the Department of State and the Department of Justice.

TCS is the largest civilian centrally managed and secure network in operation today. By the

Y2K, the Treasury Department expects to transport over 700 gigabytes per day through the TCS.

Continuous technology refreshment is built into the 10-year TCS acquisition. TCS can support a wide range of services for its customers, including, but not limited to:

- *Intra/Internetworking Services*
- *Management and Control Services*
- *Security Services*
- *Electronic Messaging*
- *Electronic Commerce*
- *Network-based Computing Services*
- *Multimedia Broadcast*
- *Internet Services*
- *Wireless Access*
- *Local Digital Services, i.e., Digital Telecommunications Systems (DTS) and Voice Messaging System(VMS).*

The TCS Network offers a full range of network and information technology products and services--from initial planning and design through development and integration, testing, and operations and maintenance.

The TCS supports the Treasury Department's Vision, as described in "A Strategic Vision for Networked Information Services", (Reference 3) and the Treasury "Strategic Plan for Fiscal Years 1997-2002" (Reference 4):

- *Fulfill the Clinger-Cohen Act: The plan for TCS anticipated Clinger-Cohen. TCS is a corporate instantiation of the key elements of the Treasury architecture, allows technology sharing, and supports enhanced mission performance by enabling its own reinvention.*
- *Create a Treasury IT architecture framework which provides a common, multi-purpose and standards based infrastructure to make sure that all systems are appropriately compatible and structured to provide maximum benefit.*

- *Integrate collaboration and information gathering within the enforcement community by providing uniform connectivity.*
- *Incorporate IT security as an essential part of the system and ensure uniform security measures.*

Business requirements of the TCS require it to effectively satisfy the missions of the Department and the Bureaus. To provide necessary Government services for the public, the Treasury Department must generate, exchange, access, and maintain information in the most efficient and effective manner. The capabilities provided by the TCS represent a major component of the information technology investment required for this.

TCS is the conduit for information services in the Department of Treasury and all of its bureaus. The objective of the program as stated in "A Strategic Vision for Networked Information Services," Department of Treasury, Office of Telecommunications Management, December 1994 is to:

"Enable the Treasury Department to better serve the Treasury Bureaus in their missions that support citizen customers by accommodating Treasury-wide internal needs and promoting access to government information and services. Leverage emerging Information Technologies to empower personnel with superior access to common information resources."

The TCS has supported the rapid growth and international expansion of the global economy, especially through the missions and efforts of the Customs Service, IRS, and Financial Management Services in encouraging the use of electronic money, electronic funds transfer, and electronic commerce. In contrast, independent networks increase risks in achieving the Treasury Strategic Plan and the Clinger-Cohen Act, due to the complexity required in coordinating the independent management actions and decisions for the independent networks.

TCS Technologies

In January 1999, the TCS served over 6,150 nationwide customer locations, employing in excess of 10,000 communications circuits. The

locations of the customers are graphically illustrated in Figure 5. The centrally managed switching fabric accommodates over 150,000 users.

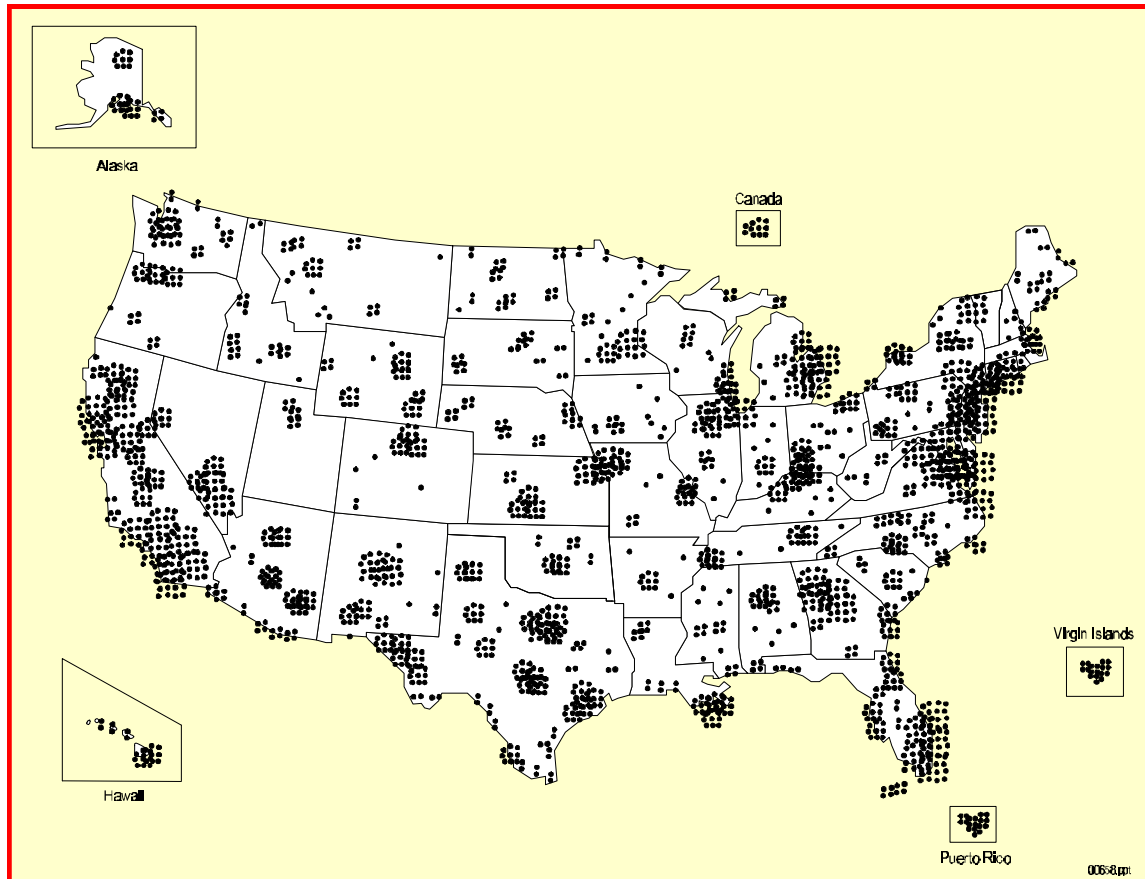


Figure 5. Illustration of the TCS Customer Locations

The number of locations served by TCS has grown by 35% at 12% per year over the past three years, supported by an increase of communications circuits of 44% at 14.9% per year. This growth rate sustained over the three-year period 1995-1998 equates to over 1.5 locations added each working day of the year.

Through four major components, the TCS facilitates the movement of the necessary information to and from the customer locations in the Treasury community and to and from its outside customers. These components are:

- *Network Services*
- *Treasury Communications Center*
- *Integrated Network Management Center*

- *Automated Security Management Center*

Network Services. The TCS architecture top layer is comprised of dedicated T-1 circuits between user sites. It can support a variety of interfaces, including Frame Relay and Synchronous Data Link Control. The access layer interconnecting the outer network layer and the user access layer consists of Packet Assembler/Disassembler (PAD) devices and TCS-supplied Integrated Access Devices (IADs). The access layer provides users with device accesses over a wide range of speeds, including Local Area Network (LAN) speeds.

TCS Communications Center (TCC). The TCC houses the integrated network

management system, the automated security management system, the operations and maintenance staff, and the executive agent and bureau representatives. Network services, such as electronic mail are managed at the TCC and distributed at customer locations throughout the network.

Integrated Network Management System.

Network management is the critical link in the operation and maintenance of TCS services.

The Integrated Network Management System (INMS) provides a highly dynamic and integrated operations and maintenance capability to improve the overall service quality for TCS customers, while at the same time reducing costs.

The INMS integrates five operations and maintenance functional areas: fault management, performance management, security management, configuration management, and billing and accounting. The INMS is an open systems architecture that interfaces with all network equipment and vendor-provided proprietary equipment managers.

The INMS provides electronic information to authorized Treasury operators, maintainers, and customers. Trouble tickets, property inventory databases, performance statistics and trend information, billing data, change management, and fault management data are all included in

the INMS on-line data. INMS provides access to this integrated management information database on a single screen that also enables service ordering and help-desk operations.

Automated Security Management System.

The TCS Automated Security Management System (ASMS) provides citizen's data privacy, identification and authentication, real time security monitoring, audit capabilities, link-encryption featuring automated system management, and electronic dissemination of encryption keys. The TCS was designed and will be tested to meet C2 equivalent security functionality.

The ASMS supplies automated management and dissemination of cryptographic keys, using the latest cryptographic management technology. The ASMS also monitors cryptographic equipment status. When a failure is detected, the equipment is switched to a spare unit, thereby ensuring data integrity and confidentiality.

Each customer community can manage and monitor their own resources and users by request, using the ASMS. This allows each customer security staff to create and analyze reports customized for their specific needs. The redundant ASMS implementation also provides backup and recovery functionality.

TCS and The Option—Measures of Merit and Compliance

A summary of the results from an analysis of the business case follows. The analysis established measures of merit, assumptions, and the status of compliance with laws and directives.

- *For comparable services, the primary measure of merit is the difference in cumulative dollar cost, over a five-year span, between the TCS and the option of independent organization networks.*
 - *Business needs for communication services of the TCS and independent networks are based on the Treasury Department's and the Bureaus' missions. The option was structured to provide comparable performance in satisfaction of the missions.*
 - *Technical options and the value of possible alternative solutions were identified through requirements development, conceptual design, and analysis.*
 - *Because this is a TCS baseline business case, the principal technical option is the set of independent networks. The requirements development indicated that the baseline and the option should deliver comparable mission performance. Conceptual designs and alternative analysis identified the option as a set of independent networks created from the TCS's assets, augmented by new acquisitions of circuits and equipment as necessary to create viable networks, to provide functionally comparable services independently funded by each of the current TCS customer organizations. For the option, there are cost and schedule impacts to transition from the TCS to the independent services.*
 - *A variant within the "option", composed of a merger of two or more of the independent networks will produce costs intermediate between TCS and the*
- entirely independent network option. This and other variants of the "option" offer only a "matter of degree" impact on the business case results.*
- *Actual cost data for the current TCS were used as a gauge to establish dominant cost categories: circuit leases, staff, maintenance, and other costs such as facility leases. Transition non-recurring costs were evaluated. The approach to transition combines technological sophistication with a conservative, phased process that avoids disruption of services and minimizes risk. The design adds minimal equipment to provide a network, a schedule incorporating required resources and tools, and is staffed by personnel to ensure timely milestone accomplishment.*
 - *TCS is in compliance with the Raines Rules, Figure 6 and the "option" is not.*
 - *The TCS is in compliance with the Treasury Department Strategic direction and budget. The "option" would require a shift of the strategic direction and budget.*
 - *The "proposed" investment impacts other initiatives and priorities.*
 - *The option investment would impose disruptions on other initiatives, which are based on the characteristics of the TCS. The impact on initiatives and priorities of the existing TCS customers consists in schedule delays in achieving their IT goals and the added transition costs to re-organize staffing, budgets, and technical operations that are external to the TCS but rely on it to accomplish the specific missions.*
 - *No funding and resources are available to support the transition to the "option".*
 - *Funds are available to continue the TCS as it exists.*

- Any change, including termination of existing services, requires additional funds for transition to alternative services and termination of existing services.
 - At this time, there are no funds identified for transition and termination.
 - It is in the interest of the Government to continue investment in TCS.
 - Existing legislation such as Clinger-Cohen strongly motivates the continued use of TCS.
- No current legislation requires the investment associated with the “option”.
- Legislation narrows the alternatives and sources of supply.
 - The TCS Vision is supported by the Treasury Enterprise CIO and was developed with participation of bureau representatives. The “option” lacks definitive support at any level.

OMB Raines Rules:	
1.	Support core/priority mission functions that need to be performed by the government: The Treasury’s core missions rely on the timely collection, analysis and distribution of immense quantities of data. Much of the information is sensitive but unclassified. The TCS provides Treasury’s nationwide backbone communications system and related corporate IT services. It enables Treasury’s participation when enhanced in a timely manner, in the Electronic Government by providing a platform for information sharing to support the public, other government agencies and bureaus within Treasury.
2.	Be undertaken by the requesting party because no private or public alternative efficiently supports that function: As yet no integrated corporate IT private or public service comparable to the TCS exists, with equivalent flexibility. Best business practice trends are in the direction of centrally managed corporate IT services.
3.	Support processes that have been simplified or otherwise redesigned and make maximum use of COTS: Network management services, automated security management processes, service request processes, and the technology infusion process have been simplified and redesigned for maximum use of current automated process technologies. The TCS uses standards based commercial off the shelf (COTS) hardware and software throughout.
4.	Demonstrate a risk-adjusted projected return on investment that is clearly equal to or better than alternative uses: The TCS investment consists primarily of sunk funds, with further investments anticipated to improve the range and quality of services within affordable costs. In contrast, as shown by the Findings, the TCS exhibits substantial ROI compared to the option.
5.	Consistent with federal, agency, and bureau information architecture: TCS consistency with federal architecture relies on coordination of the TCS architecture with other Federal architectures, through the CIO and CIO staff participation in federal IT strategic planing, council meetings and related activities. The Department as agency coordinates the TCS with other aspects of the IT architecture. Bureau customers and TCS continuously harmonize the respective architectures, through planning documents.
6.	Reduce risk: The TCS program structure uses centralized strategic management and distributed implementation to balance, control and mitigate overall risks. The ability of customers under the Working Capital Fund to withhold resources ensures continuous attention to customer needs, costs, and satisfaction in a manner otherwise obtainable only from the option.
7.	Implemented in phased, successive chunks: The TCS program provides for continuous phased successive implementation by means of the service request process for small scale details, and by periodic technology infusion with introduction of large scale enhancements, e.g., ATM.
8.	Employ an acquisition strategy that appropriately allocates risk between government and contractor, effectively uses competition, ties contract payments to accomplishments, and takes maximum advantage of commercial technology: The success of TCS along with the inherent responsibilities, and risks are shared by Treasury with the prime contractor. To maximize competition by outsourcing, the prime contractor can flexibly shift subcontract scope and schedules, and quickly adjust staffing to meet rapidly changing requirements and opportunities. Contract payments are tied to performance criteria, and commercial technology is used throughout in standards based COTS.

Figure 6. Raines Rules

References

1. “@Risk Advanced Risk Analysis For Spreadsheets”, Palisades Corporation, Newfield NY, 14867, copyright 1995.
 2. “Strategic Plan for Fiscal Years 1998- 2002”, Department of Treasury, September 1997.
 3. “A Strategic Vision For Networked Information Services”, Department of the Treasury Office of Telecommunications Management, December 1994 -distributed in 1997.
 4. “Executive Summary of Information Systems Plans - Fiscal Years 1997-2001”, Department of the Treasury Office of the Deputy Assistant Secretary for Information Systems (DASIS).
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Acronyms

ASMS	Automated Security Management System
ATF	Alcohol, Tobacco & Firearms
COTS	Commercial Off the Shelf
DASIS	Deputy Assistant Secretary for Information Systems
DTS	Digital Telecommunications System
FY	Fiscal Year
GFE	Government Furnished Equipment
GPRA	Government Performance and Results Act
GSII	Government Services Information Infrastructure
IAD	Integrated Access Device
INMS	Integrated Network Management System
IS	Information Service
IT	Information Technology
NOC	Network Operations Center
NII	National Information Infrastructure
NPR	National Performance Review
OMB	Office of Management and Budget
TCE	Treasury Communications Enterprise
TCS	Treasury Communications System
VMS	Voice Messaging System

Appendix—Cost Analysis Procedure

Introduction

The business case estimates the costs for comparable performance of the TCS and the option, as of early FY 1999. Future influences such as inflation, circuit costs reductions, and technology changes would similarly modify costs of both the TCS and the option. The two major features of the Cost Analysis are:

- 1) Assumptions for the Business Case
- 2) Monte-Carlo Cost Simulation Model.

Assumptions for the Business Case

- *Mission satisfaction and performance were comparable for the TCS and the option.*
- *For the purposes of this analysis, growth, scope and types of value-added services such as Internet service were assumed to be stable over the time frame of the analyses.*
- *Users of the option independent networks would communicate to the locations and maintain the traffic loads currently projected on the TCS.*
- *Unique organization performance requirements, such as dual homing, and time-critical data transmission for law-enforcement users such as the ATF, Secret Service and Customs were assumed to be the same for the TCS and the option. (Reference 4).*
- *The 1Q99 was assumed to provide a “snapshot” of TCS operations and costs.*
- *For the option, existing assets of the TCS were assumed to transfer as government furnished equipment (GFE) to the current users. Non-divisible assets of the TCS, such as the Network Operations Center (NOC) and the security firewalls, were assumed to transfer to one of the largest of the independent networks.*
- *The same mix of commercial and FTS circuits were assumed to be available for the*

TCS and the option. Constraints on the TCS and the option require use of FTS-2000 government provisioned circuits wherever services are available. Otherwise, commercial service may be used. Statistics of TCS billed costs per circuit revealed limited dependence of the total circuit costs on the mix of FTS-2000 and commercial circuits.

- *The overall cumulative cost trends were built up from the dominant recurring and non-recurring cost categories as follows:*
 - *Circuits with the associated equipment provide the transport of information among locations. The recurring costs were identified for all circuits and non-recurring costs were identified for new circuits.*
 - *Staff manages the network operations, provide IT services, change the network services as customer requirements change, provide legal review, documentation, and other support.*
 - *Maintenance ensures continuing effectiveness of all hardware and software. Training ensures effectiveness of the staff.*
 - *Leases and other costs for facilities, et al.*
 - *Transition non-recurring costs include staff labor, equipment purchase, equipment and circuit connections, acquisition and training of new staff, etc. The transition costs cover staffing for technical, network management, financial, and legal activities as well as all actions to make the independent networks viable. Costs are included for parallel “shadow” operation of the TCS during transition. Transition from the TCS, for compliance with the funding cycle and a practical transition were*

assumed to require one FY from date of approval.

- *Non-recurring events such as Y2K actions and funding were not addressed in the either TCS or the option, for the sake of simplicity.*
- *Organizations that use TCS services without direct costs under various Treasury agreements were not included in the business case. If independent networks replaced the TCS, the other users such as the Department of Justice would have to find alternative service providers, which may not be adequately addressed by independent bureaus.*

Procedure

The analysis used a computer model of the dominant cost categories. A schedule based time-phased model was used to cost the transition from the TCS to independent networks. Cost results of various potential decisions during implementation of the option of independent networks were evaluated by a “Monte-Carlo” simulation procedure.

For the simulation, in each dominant cost category a range of individual costs were established from reference information, resulting in a probability distribution for different implementations. For each of over 1,000 simulations of the decisions, the combination of costs was selected by the equivalent of randomly rolling dice in a gambling game.

The computer application “Excel” was used with the “@Risk” application to generate the range of cost estimates. It was the use of simulated dice rolling to pick each combination that caused the technique to be named after the gambling resort ‘Monte-Carlo’.

The simulations examined the range of circuits per location in the independent networks option. In place of the Gauss or “normal” bell distribution of probabilities for the numbers of circuits, a triangular distribution was used because that best matched the technical constraints.

Strategies that were evaluated for the option independent networks included:

- *Circuit quantities ranging from a minimum with the current sparse mesh, up to a maximum of full interconnection of locations.*
- *Staff costs ranging to zero (absorbed by existing staffs or contracts of the independent networks.)*
- *Lease costs ranging from \$4 to \$50 per square foot, with an expected cost of \$25*
- *Non-recurring staff and equipment costs ranging from zero up to typical costs.*

TCS also had a range of strategies to reduce operating costs. For the TCS, the expected costs were based on an assumption that the government would make changes in the TCS that improve the cost-effectiveness. Among the possibilities are circuit consolidation, technology refreshment, circuit order aggregation, and a waiver of FTS-2000 use, where appropriate.

There is a cumulative cost advantage of the consolidated acquisition and management of communications services exemplified by the “TCS” as compared to the “option”.

